1987 AIR QUALITY DATA SUMMARY REGIONAL MUNICIPALITY OF WATERLOO AND THE COUNTY OF WELLINGTON

JUNE 1989

Environment Ontario

Jim Bradley
Minister

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REGIONAL MUNICIPALITY OF WATERLOO AND THE COUNTY OF WELLINGTON

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WEST CENTRAL REGION

JUNE 1989

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INTRODUCTION

This report summarizes the results of air monitoring in the Regional Municipality of Waterloo and the County of Wellington in 1987.

The Ministry of the Environment's West Central Region has conducted routine monitoring in the area since the early 1970's. The Air Management Program in Ontario is based on controlling man-made emissions to meet ambient air quality objectives. These in turn are based on known effects on health, quality of life or sensitive vegetation, whichever is most stringent. To achieve these objectives, sources of pollution are identified, their emissions evaluated and appropriate control measures are instituted. Ambient air monitoring is used to identify pollution sources, evaluate the need for controls and then determine whether controls have been successful.

In addition to monitoring specific industrial sources, monitoring of a more general nature is also carried out in various localities to ensure that air quality objectives are being met and to observe trends in air pollution.

MONITORING NETWORK

The Ministry of the Environment's West Central Region operates a network of monitors in the area in Ayr, Breslau, Puslinch Township, Guelph and Kitchener. Much of the monitoring was performed near industrial sources, in many cases, as a response to local complaints. Monitoring of a more general nature was also carried out at single stations in Guelph and Kitchener to characterize air quality in larger population centres.

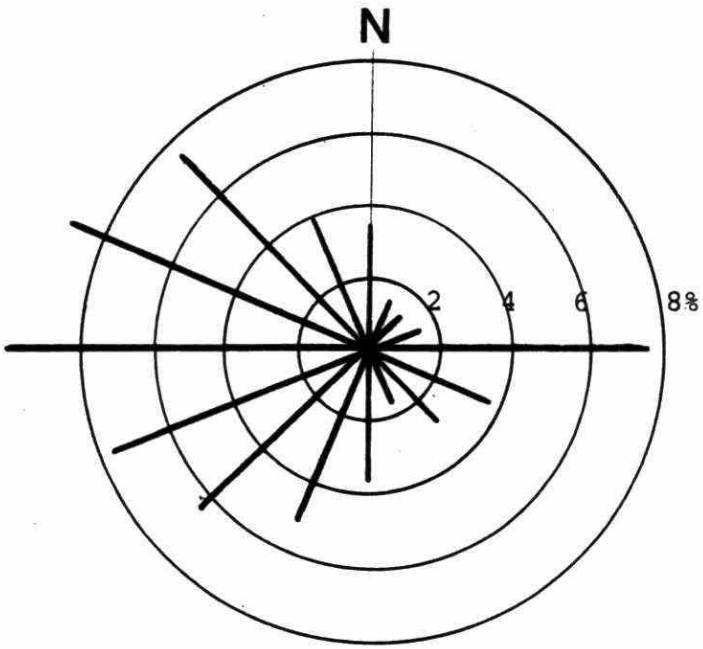
Meteorological data (wind speed and direction) are not measured by the Ministry in the area. However, data measured by Environment Canada at the Waterloo-Wellington Airport is provided to the Ministry for data analysis. Figure 1 illustrates the wind frequency distribution for the area and shows that winds from the southwest, west and northwest quadrants predominate almost 50% of the time. Consequently, wherever possible, stations are located "downwind" of suspected pollution sources with respect to these winds.

Wind data were utilized in a computer program known as a "pollution rose" - essentially a cross-tabulation of average hourly pollutant concentrations with wind direction. The data from this program are illustrated on various maps in this report and are a useful tool in determining the impact on any given source on a monitoring station. The length of each line of the "rose" is proportional to the average concentration when the wind was blowing from that direction.

FIGURE 1

WIND FREQUENCY DISTRIBUTION - 1986

WATERLOO-WELLINGTON AIRPORT



Lines indicate direction wind blew <u>from</u>

POLLUTANTS MONITORED

Two basic types of air pollutants are measured-gases and particulates (dust).

a) Gases measured with continuous analyzers include:

- Sulphur Dioxide (SO_2) - monitored in Guelph and Kitchener for general ambient levels. SO_2 is a product of fuel combustion. Air quality criteria and their limiting factors are:

1-hour average	- .25 ppm	(vegetation effects)
24-hour average	- .10 ppm	(health effects in conjunction with particulates)
1-year average	- .02 ppm	(vegetation effects)

- Carbon-Monoxide-(CO) - general ambient levels are measured in Kitchener. The major source of CO is the automobile. Criteria for CO are:

1-hour average	- 30 ppm	(health effects)
8-hour average	- 13 ppm	(health effects)

- Ozone (O_3) - measured in Kitchener and Guelph to check general ambient levels. Oxidants are products of photochemical reactions involving oxides of nitrogen, hydrocarbons and sunlight and ozone accounts for most of the oxidants produced. The sources of the precursor pollutants are mainly industrial and automotive. Concentrations follow very definite annual and daily trends with highest levels occurring during the summer, and daily maxima usually occurring in mid-afternoon. Both patterns are directly related to temperature and the amount and intensity of sunlight. Ozone and its precursors

can be transported over great distances and can be augmented by local sources. Most of the high levels measured in Southern Ontario each summer arrive from the United States. An objective for ozone is:

1-hour average - 80 ppb (vegetation effects)

- Oxides of Nitrogen - general ambient levels were measured in Kitchener. They are a product of high temperature combustion sources including the automobile. The most abundant oxides are nitric oxide (NO) and nitrogen dioxide (NO_2). Criteria exist only for NO_2:

  1-hour average - .20 ppm (odour)
  24-hour average - .10 ppm (health effects)

b) Particulates (dust) were measured by three methods, each relating to a different size range of particles.

- Dustfall - heavy material generally greater than 10 microns in size (one micron is one-millionth of a metre) that settles out of the atmosphere by gravity. A plastic container is exposed for one month and the collected dust is weighed and expressed as a deposition rate of grams/square metre/30 days. The measurement is imprecise and observations are restricted to relatively local areas. Criteria are:

  1-month average - 7.0 g/m^2/30 days (nuisance effects)
  1-year average - 4.5 g/m^2/30 days (nuisance) effects)

- Total Suspended Particulates (TSP) - measured with high volume (hi-vol) samplers near industrial sources and for general ambient observations. The particles

range from submicron to about 50 microns in size. The hi-vol sampler draws air through a glass fibre filter for a 24 hour period. The exposed filter is weighed and the weight of solids collected is converted to an equivalent concentration in air. Units used are micrograms per cubic metre. The samplers run once every six days. Criteria based on health effects in conjunction with sulphur dioxide are:

24-hour average - 120 ug/m^3 (health effects)
1-year geometric mean - 60 ug/m^3 (health effects)

- Soiling Index (Coefficient of Haze) - general ambient levels were measured in Kitchener and Guelph by tape samplers which measure fine particles less than 10 microns. Coefficient of haze tape samplers determine hourly soiling values. Air is drawn through a filter paper tape for one hour. A beam of light is shone through the paper before and after the airborne particles are collected. The difference in light transmission is translated into a coefficient of haze (COH) unit. The paper tape then advances and a new hourly sample is collected. The criteria shown below are based largely on correlations with total suspended particulate (TSP).

  24-hour average - 1.0 COH's/1000 linear feet of air
  1-year average - .5 COH's/1000 linear feet of air

DATA ANALYSIS

Ayr

Dustfall has been measured at station 26026 - Stanley St. near the Date Industries Foundry since 1976 (Figure 2). Past data had shown extremely high dustfall concentrations well above objectives. In-plant surveys had revealed no obvious evidence of continual emissions but short periodic emissions had been witnessed.

In 1986, it was discovered that an improper siting of the sampler had at least partially caused the high readings. The jar had been sitting directly beneath a set of hydro transformers from which rainwater washed particulates into the jar.

In October of 1986, the jar was moved a few poles west down Stanley St., free of interferences, and subsequently the final three samples of that year all met the yearly objective. However, in 1987, all ten valid samples (2 were spoiled) exceeded the monthly objective, many by a large margin. Microscopic analysis showed that the samples usually contained mostly foundry materials, carbons, silica and iron oxide. All dustfall data are given in Table 1.

In addition to the dustfall sampling, a special survey was conducted during August to December to measure suspended particulates with a pair of high volume samplers. One sampler (26051) was located on William Street, about 250 metres southwest of the foundry and another sampler (26052) was located on a bank adjacent to the foundry. Concentrations at the William Street location were very low, meeting all objectives. However, at the bank site, 6 samples out of 39 exceeded the daily objective and the foundry was clearly implicated as a significant source of dust emissions. Data are given in Table 2.

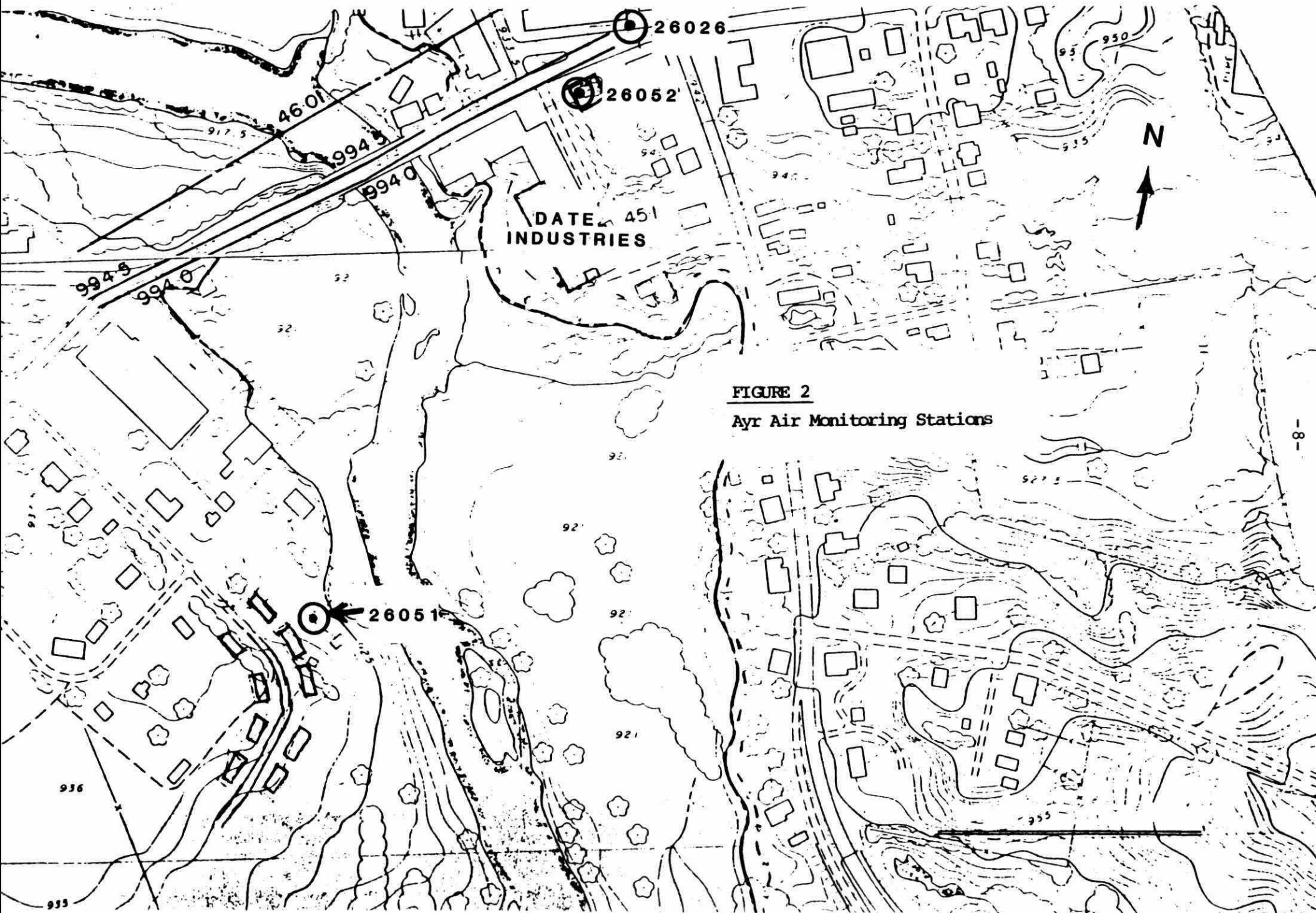


FIGURE 2

Ayr Air Monitoring Stations

TABLE 1

1987 MICROSCOPIC ANALYSIS OF DUSTFALL (INSOLUBLE PORTION)
VOLUME PERCENTAGES

ONT.OBJECTIVES: 7.0 g/sq.m./30 days (1 month)
4.5 " (Annual average)

STATION: 26026 - STANLEY/SWAN, AYR NEAR DATE INDUSTRIES FOUNDRY

SUBSTANCE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
GRAPHITE													
COAL		7	9		5					11	11		
COKE	29	65	40		50	60	60		30	64	61	62	
SOOT													
KISH													
FOUNDRY SAND			5						4	14	14	11	
FLYASH													
SILICA	28	8	18						36	5		8	
WOOD CHAR													
WOOD FIBRES									20				
CARBONATE	29		14		5								
IRON OXIDE	10	20	12			10			10	6	14	9	
BIOLOG. MAT'L					40	30	40						
OTHER	4*		2*									11*	ANNUAL AVERAGE
TOTAL LOADING g/m2/30 days	22.4	9.0	22.7	--	17.2	8.3	9.0	--	13.6	14.3	13.1	9.1	13.9
	* oil soot	Fire on Feb.9	* slag									* slag	

TABLE 2

SPECIAL SURVEY

AUGUST - DECEMBER 1987

PARTICULATES NEAR DATE INDUSTRIES

OBJECTIVES : 120 (24 hour)
60 (Annual Geo.Mean)

SUSPENDED PARTICULATES - micrograms per cubic metre

STATION	GEOMETRIC MEAN 1987	1987 MAXIMUM 24 HR	NO.OF SAMPLES	NO.TIMES OVER OBJECTIVE 24 HR	1 YR
26051 WILLIAM ST AYR	28	103	39	0	0
26052 STANLEY ST AYR	55	246	39	6	0

The foundry's effect was very localized and stack emissions and fugitive sources were identified as requiring better control.

A plant survey conducted in mid-1988 and a Control Order is in the process of being issued to the company which requires emission control equipment to be installed on the cupola by fall, 1989. The company is also to carry out studies to determine other fugitive emission sources and to determine best control measures for them.

Breslau

Dustfall near Breslube measured at station 26036 on Fountain Road (Figure 3) deteriorated in 1987 (Table 3). The monthly objective was exceeded six times, compared to five in 1985. The increased levels were mainly due to construction activities on the Breslube property and the Forwell gravel pit located behind the Breslube property. This latter source may have become more prominent in 1987, due to changing areas of extraction closer to the sampler. The construction activities at Breslube should end by the end of 1988.

Since the greatest potential source of dust at Breslube used to be lime storage and handling, the samples were analyzed for calcium (lime is calcium carbonate) and lower concentrations were found in 1987 than in 1986, contrary to the dustfall average. Lime usage at Breslube is down considerably from the past. The trends in yearly averages of dustfall and its calcium content are given in Figure 4.

Since all lime at Breslube is enclosed in a large silo, emissions are negligible and since construction activities were the main source of dust, the sampler will be removed in 1988. Dust complaints are no longer received.

FIGURE 3
Breslau Air Monitoring Station

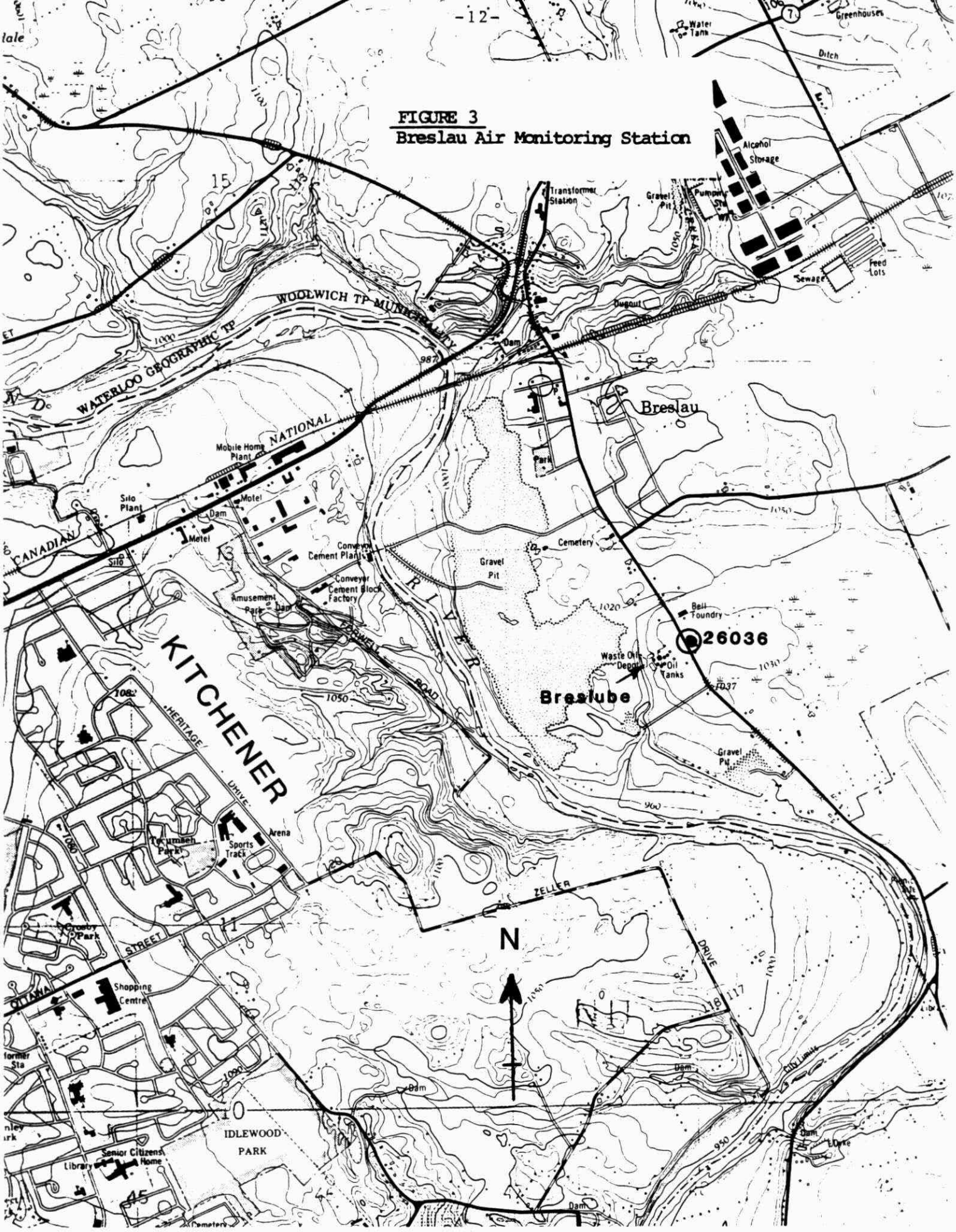


TABLE 3

SUMMARY STATISTICS - BRESLAU

PARTICULATES NEAR BRESLUBE LTD.

DUSTFALL - grams/square metre/30 days

ONT.OBJECTIVES : 7.0(1 MONTH)
4.5(ANNUAL AVERAGE)

STATION	ANNUAL AVERAGE 1985	1986	1987	1987 MAXIMUM 1 MONTH	NO.MONTHS OVER OBJECTIVE 1985	1986	1987
26036 - FOUNTAIN RD BRESLAU	5.5	5.2	8.4	12.7	2	5	6

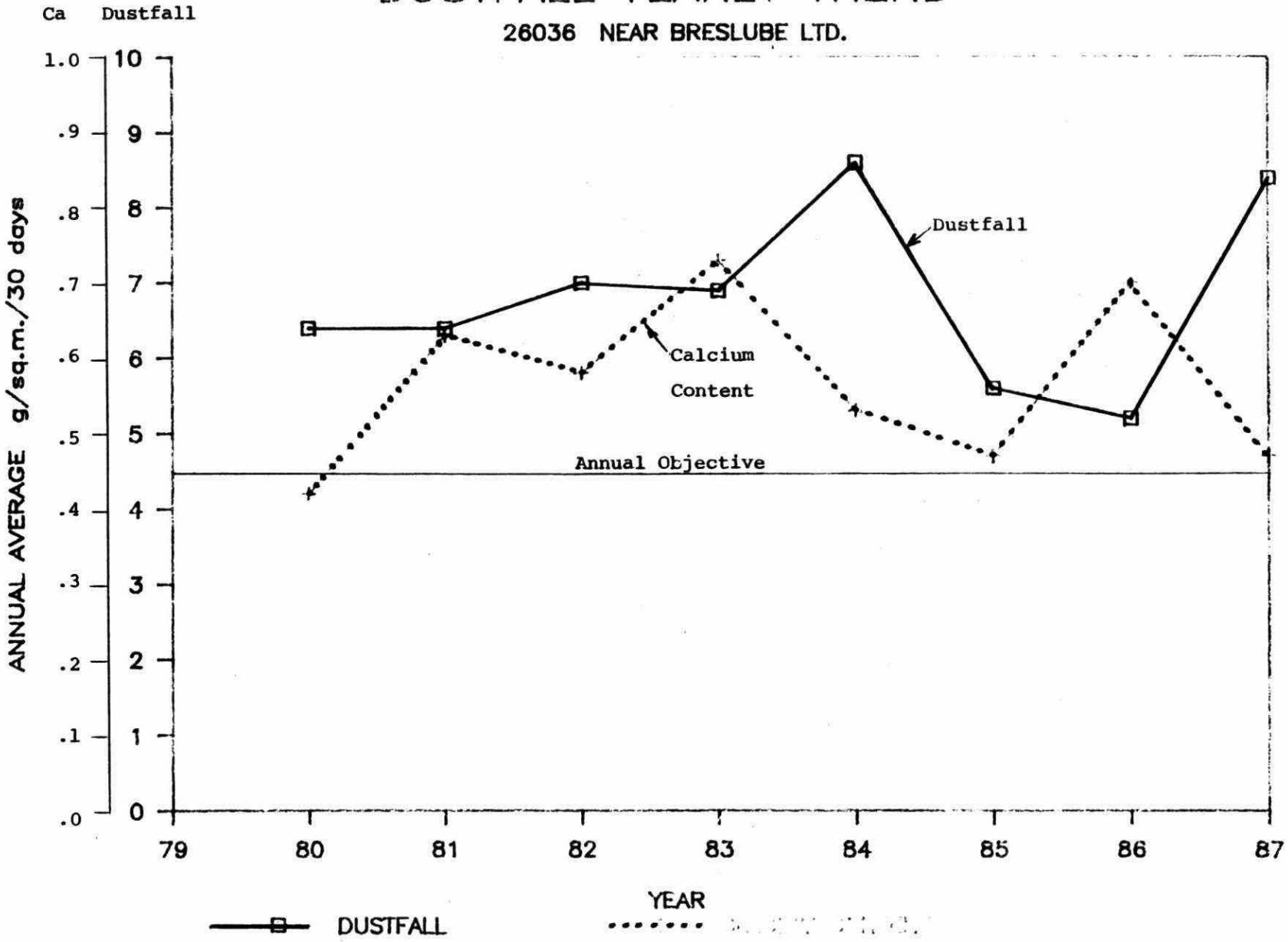
CALCIUM IN DUSTFALL - grams/square metre/30 days

26036 - FOUNTAIN RD BRESLAU	0.47	0.70	0.48	1.00	No Objective		

FIGURE 4

DUSTFALL YEARLY TREND

26036 NEAR BRESLUBE LTD.



Odourous emissions from Breslube are largely under control, barring upset conditions and fugitive emissions, but it should be noted that upsets can occur and cause odour problems in the vicinity of the plant and a large area of Kitchener. Attempts are being made to minimize these problems. In 1985, a new vacuum distillation system was brought on line and it was thought that this installation improved air quality. In 1986, several other modifications and procedures were instituted in response to a plant survey and in 1988, a major piece of equipment known as a hydro treater was installed, changing the oil cleaning process. Together with a new incinerator, this will result in better control of odourous emissions.

Guelph

The main station (28028) in Guelph to measure general ambient air quality is located at Exhibition Park (Figure 5). Sulphur dioxide continued to record mostly very low levels and all objectives were met (Table 4). The pollution rose in Figure 6 indicates highest average concentrations (albeit very low) arrived from the southeast. The SO_2 trend graph in Figure 7 illustrates the low stable concentrations measured here since 1981, well below the annual objective.

Ozone was monitored at station 28028 in 1987 and data are summarized in Table 4. The hourly ozone objective was exceeded during 75 hours, all during the spring and summer. Ozone is a photochemical product of the chemical reaction between nitrogen oxides and certain hydrocarbons in the presence of sunlight. The pollution rose given in Figure 8 shows uniform average concentrations from almost all directions. However, the highest levels all occurred during southerly winds and were largely imported from the United States. At these times levels were high throughout Southern Ontario. The pollution rose does not indicate this because the rose was computed for the entire year and southerly winds

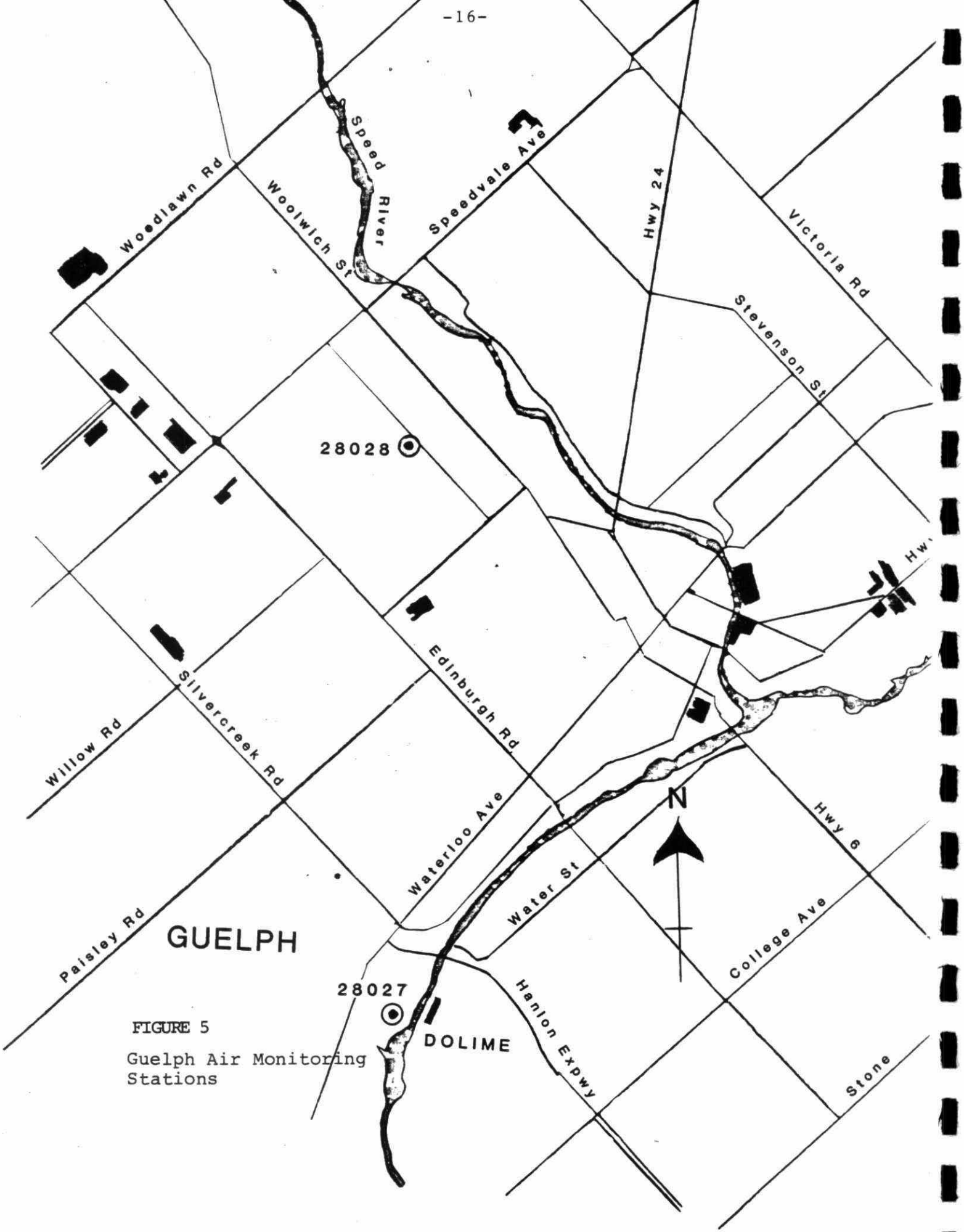


FIGURE 5

Guelph Air Monitoring Stations

TABLE 4

SUMMARY STATISTICS - GUELPH

CONTINUOUS POLLUTANTS

28028 - EXHIBITION/CLARK

POLLUTANT	ANNUAL AVERAGE 1985	1986	1987	1987 MAXIMUM 1 HR	24 HR	OBJECTIVE 1 HR	24 HR	1 YR	NO.TIMES OVER OBJECTIVE(1987) 1 HR	24 HR	1 YR
SULPHUR DIOXIDE SO2(ppm)	0.003	0.003	0.004	0.06	0.03	0.25	0.10	0.02	0	0	0
SOILING INDEX COH(COH's)	-	-	0.35		1.2		1.0	0.5		4	0
OZONE O3(ppb)	-	22.7	23.8	104		80			75		

OBJECTIVES : 120 (24 hour)
60 (Annual Geo.Mean)

SUSPENDED PARTICULATES - micrograms per cubic metre

STATION	GEOMETRIC MEAN 1985	1986	1987	1987 MAXIMUM 24 HR	NO.OF SAMPLES	NO.TIMES OVER OBJECTIVE(1987) 24 HR	1 YR	SOURCE MONITORED
28028 - EXHIBITION/ CLARK	30	34	39	184	57	2	0	AMBIENT
28027 - SEWAGE TREAT PLANT	61	53	50	220	57	7	0	DOLIME

CARBONATE IN SUSP. PARTIC. - micrograms per cubic metre

STATION	GEOMETRIC MEAN 1985	1986	1987	1987 MAXIMUM 24 HR	NO.OF SAMPLES	NO.TIMES OVER OBJECTIVE(1987) 24 HR	1 YR	SOURCE MONITORED
28027 - SEWAGE TREAT PLANT	0.59	0.52	0.20	11.8	57	No Objective		DOLIME

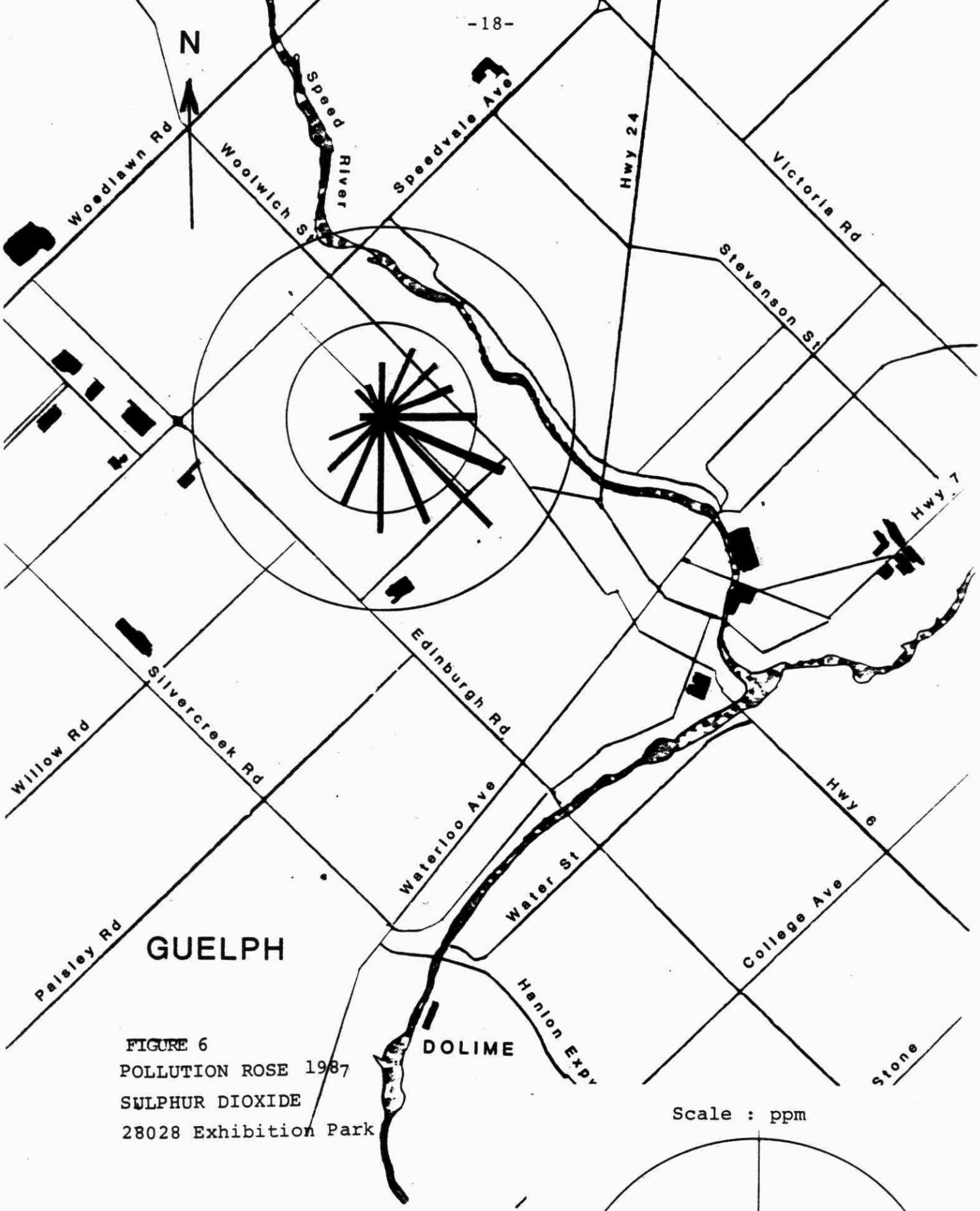
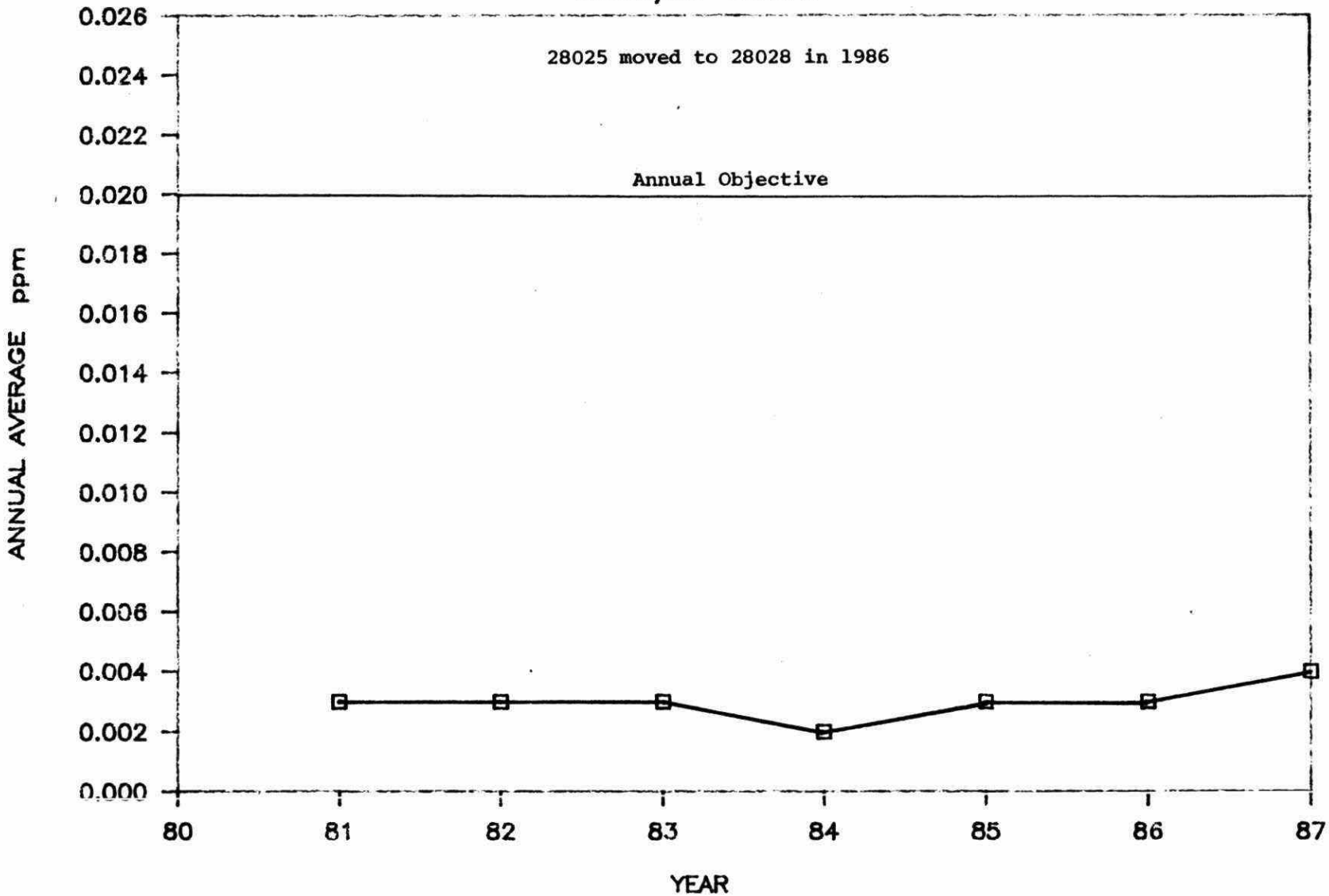


FIGURE 6
POLLUTION ROSE 1987
SULPHUR DIOXIDE
28028 Exhibition Park

FIGURE 7

SULPHUR DIOXIDE YEARLY TREND

28025/28 GUELPH



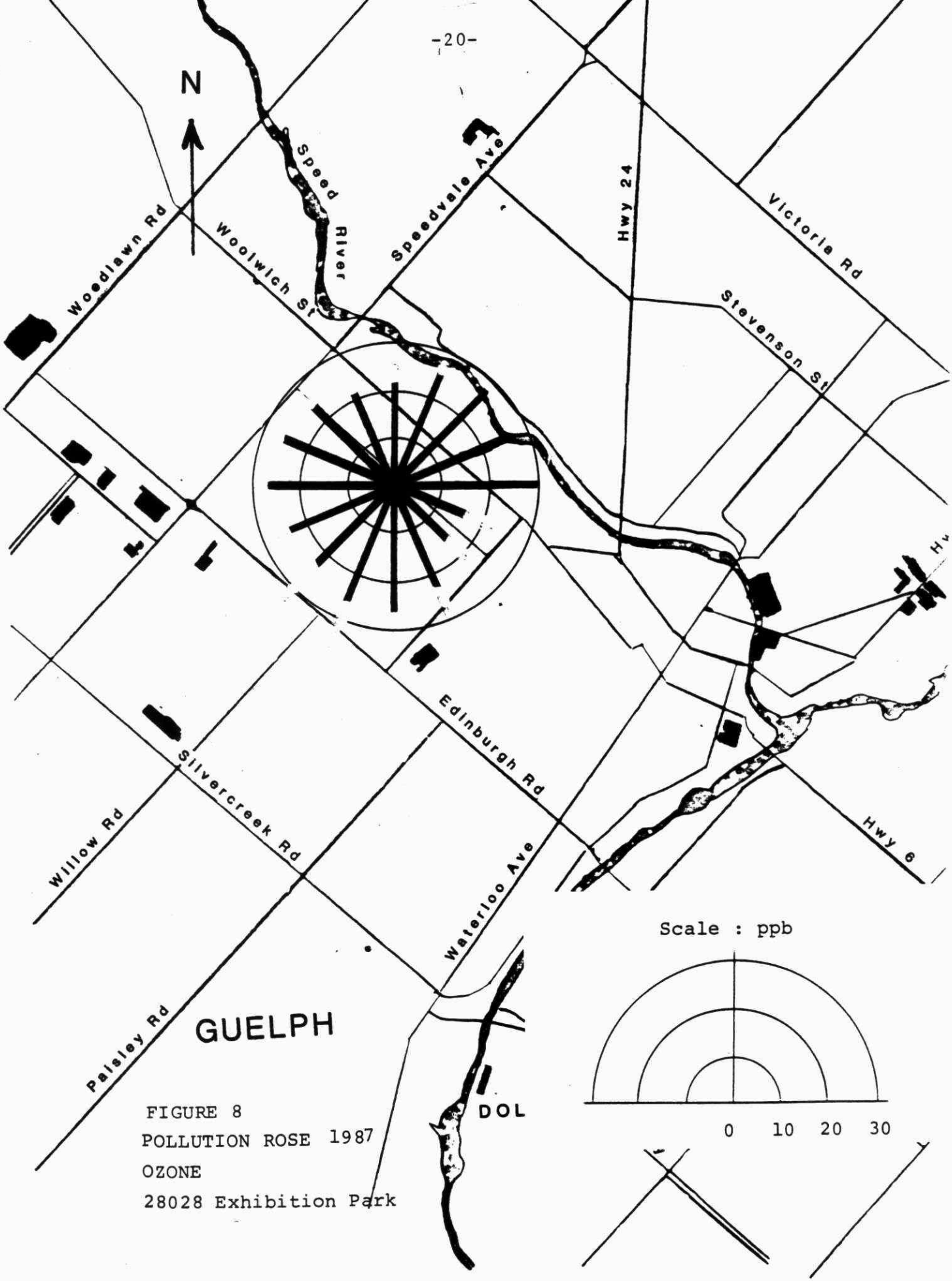


FIGURE 8
POLLUTION ROSE 1987
OZONE
28028 Exhibition Park

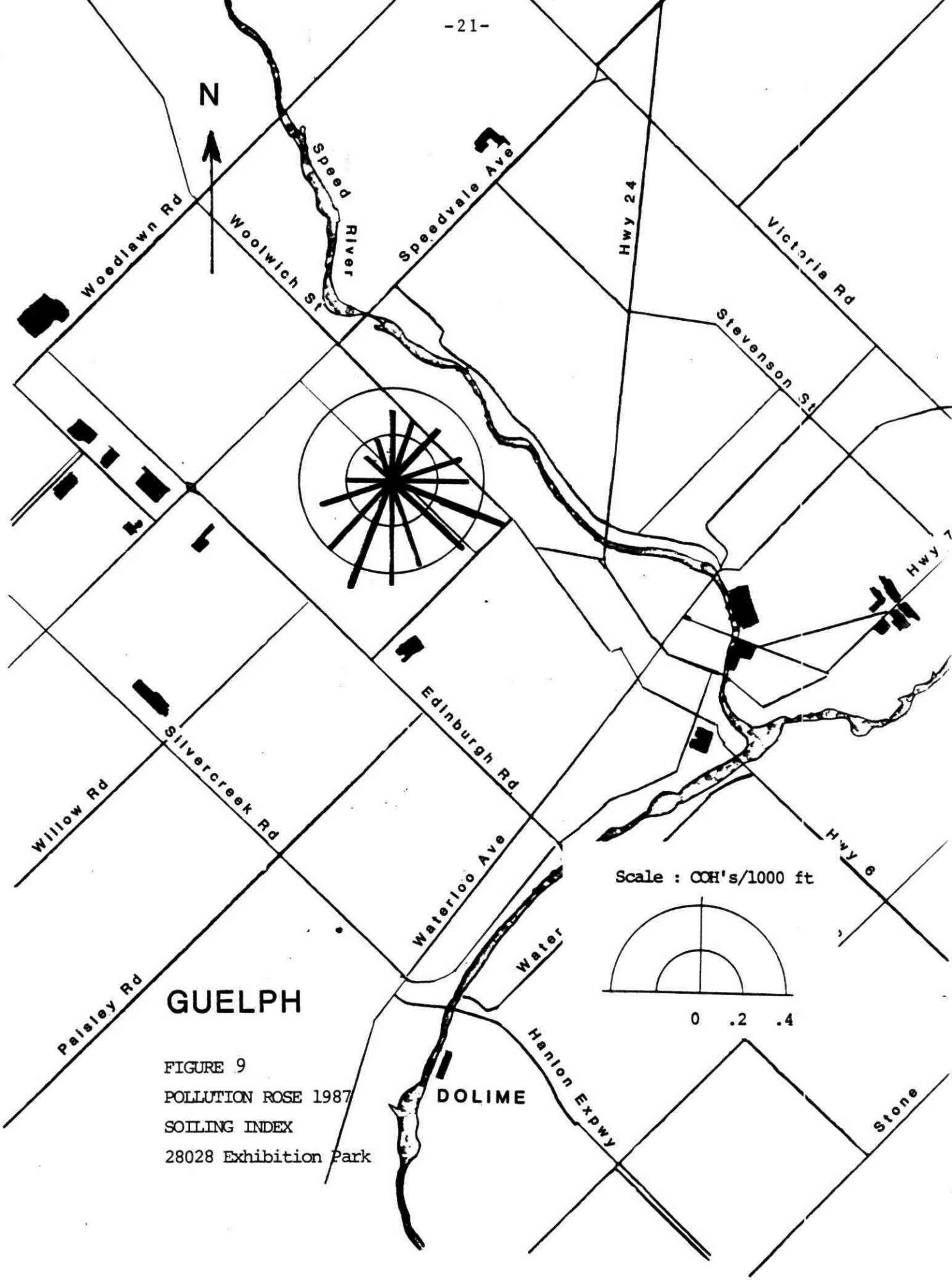


FIGURE 9
POLLUTION ROSE 1987
SOILING INDEX
28028 Exhibition Park

do not automatically yield high ozone, even during the summer. Specific meteorological conditions are necessary, namely hot, sunny weather.

Starting in 1987, soiling index, a measure of fine particles less than 10 microns in size, was monitored at station 28028. Levels measured were well below the annual objective (Table 4). However, there were four days in which the daily objective was exceeded, mostly during poor dispersion conditions. The pollution rose given in Figure 9 shows that highest levels occurred with winds from the south and southeast quadrants.

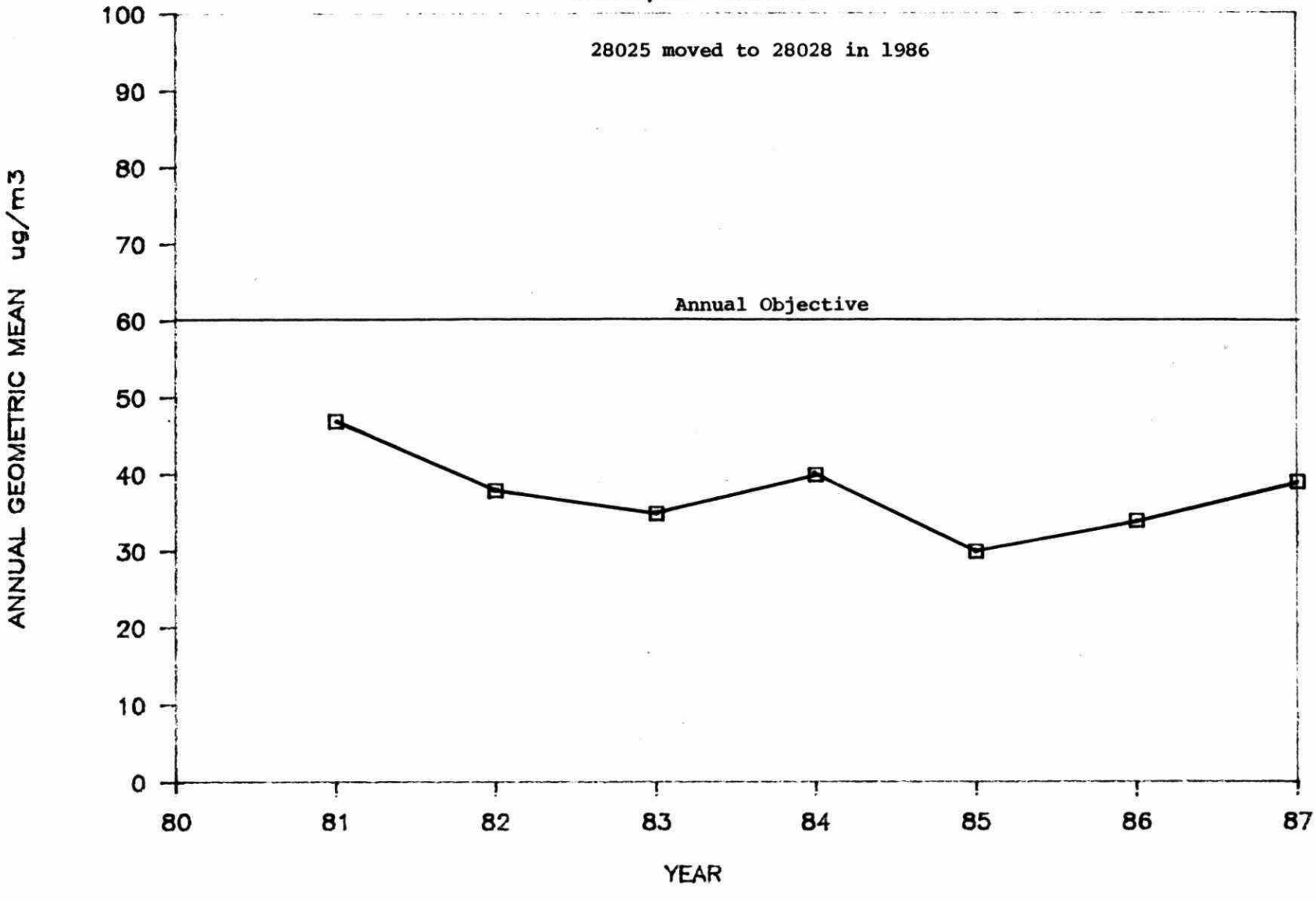
Suspended particulate concentrations measured at 28028 were very low year-round, similar to levels in rural areas (Table 4). There were two samples which exceeded the daily objective. One of these occurred on May 9, during a severe windstorm which raised particulate levels throughout Southern Ontario.

The trend for suspended particulates is displayed in Figure 10. If this curve is superimposed on a similar one for Kitchener station 26029, it shows that the Guelph and Kitchener stations display identical trends from 1981 to 1987. The variations which occur are likely due to mesoscale phenomena, i.e., long range transport of particulates into the area from distant sources.

Suspended particulate concentrations were also measured near Dolime (a lime quarry operation) at station 28027 at the sewage treatment plant on Waterloo Ave. (Figure 5). Concentrations were unchanged from 1986, remaining below the yearly objective (Table 5). Seven samples out of 57 exceeded the daily objective. However, only a couple of these readings could be attributed to Dolime. Correlation of the data with wind direction indicated a weak correlationship with east winds, ie., from Dolime. The main source of dust

FIGURE 10

SUSPENDED PARTICULATES YEARLY TREND



affecting the station in 1987 was construction on the STP grounds. Nearby road construction was a factor as well.

The samples were analyzed for carbonate (lime is calcium carbonate) and summary statistics are given in Table 4. The carbonate concentrations also correlated only weakly with east winds, further confirming Dolime was not the main source of particulates in the area.

The sources of particulate emissions at Dolime were their lime kilns. As a result of a Control Order served on Dolime in 1986, the company installed scrubbers on the lime kilns in October, 1987. There were no high concentrations measured since that time in 1987 and very few in early 1988. Thus, the new scrubbers have been effective in controlling particulate emissions.

Kitchener

The main monitoring station 26029 at Edna and Frederick Streets (Figure 11) continued to showed acceptable levels of sulphur dioxide, soiling index, carbon monoxide and nitrogen dioxide meeting all criteria (Table 5). Trend graphs in Figures 12, 13 and 14 for SO_2, CO and NO_2 illustrate stable levels dating back to 1977.

Ozone concentrations (Table 5) also remained relatively unchanged, with 21 hours above the hourly objective. The trend graph of exceedence events in Figure 15 shows random variation from year to year. This is related to weather variability, that is, temperatures and quantities of sunshine each summer, when all exceedences occur.

Pollution roses are presented in Figures 16 to 20. With the exception of ozone, all peaks occurred under northeast, east or southeast winds - from the adjacent Conestogo Parkway.

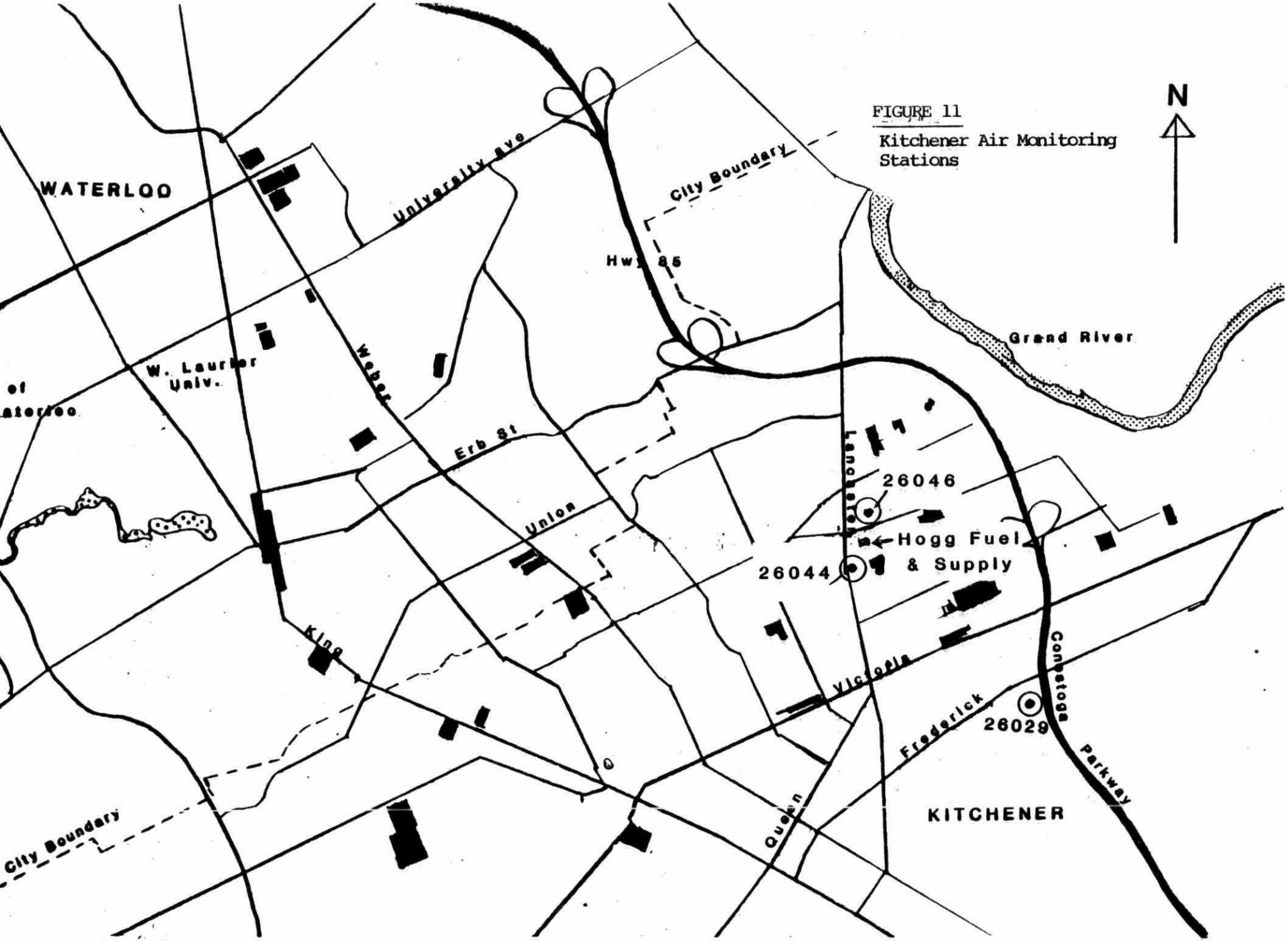


FIGURE 11

Kitchener Air Monitoring Stations

TABLE 5

SUMMARY STATISTICS - KITCHENER

CONTINUOUS POLLUTANTS

26029 - EDNA/FREDERICK

POLLUTANT	ANNUAL AVERAGE 1985	1986	1987	1987 MAXIMUM 1 HR	8 HR	24 HR	OBJECTIVE 1 HR	8 HR	24 HR	1 YR	NO.TIMES OVER OBJECTIVE(1987) 1 HR	8 HR	24 HR	1 YR
SULPHUR DIOXIDE SO2(ppm)	0.002	0.003	0.004	0.06		0.02	0.25		0.10	0.02	0		0	0
SOILING INDEX COH(COH's)	-	-	0.37			1.1			1.0	0.5			1	0
CARBON MONOXIDE CO(ppm)	0.8	0.9	0.8	12	5		30	13			0	0		
NITROGEN DIOXIDE NO2(ppm)	0.029	0.032	0.026	0.10		0.06	0.20		0.10		0		0	
OZONE O3(ppb)	19.9	17.0	17.1	94			80				21			

OBJECTIVES : 120 (24 hour)
60 (Annual Geo.Mean)

SUSPENDED PARTICULATES - micrograms per cubic metre

STATION	GEOMETRIC MEAN 1985	1986	1987	1987 MAXIMUM 24 HR	NO.OF SAMPLES	NO.TIMES OVER OBJECTIVE(1987) 24 HR	1 YR
26029 EDNA/FREDERICK	46	56	61	271	57	5	1

SPECIAL SURVEY

MAY - OCTOBER 1987

PARTICULATES NEAR HOGG FUEL & SUPPLY

OBJECTIVES : 120 (24 hour)
60 (Annual Geo.Mean)

SUSPENDED PARTICULATES - micrograms per cubic metre

STATION	GEOMETRIC MEAN 1987	1987 MAXIMUM 24 HR	NO.OF SAMPLES	NO.TIMES OVER OBJECTIVE(1987) 24 HR	1 YR
26044 LANCASTER ST KITCHENER	54	275	42	2	0
26046 GUELPH ST KITCHENER	41	101	41	0	0

FIGURE 12

SULPHUR DIOXIDE YEARLY TREND

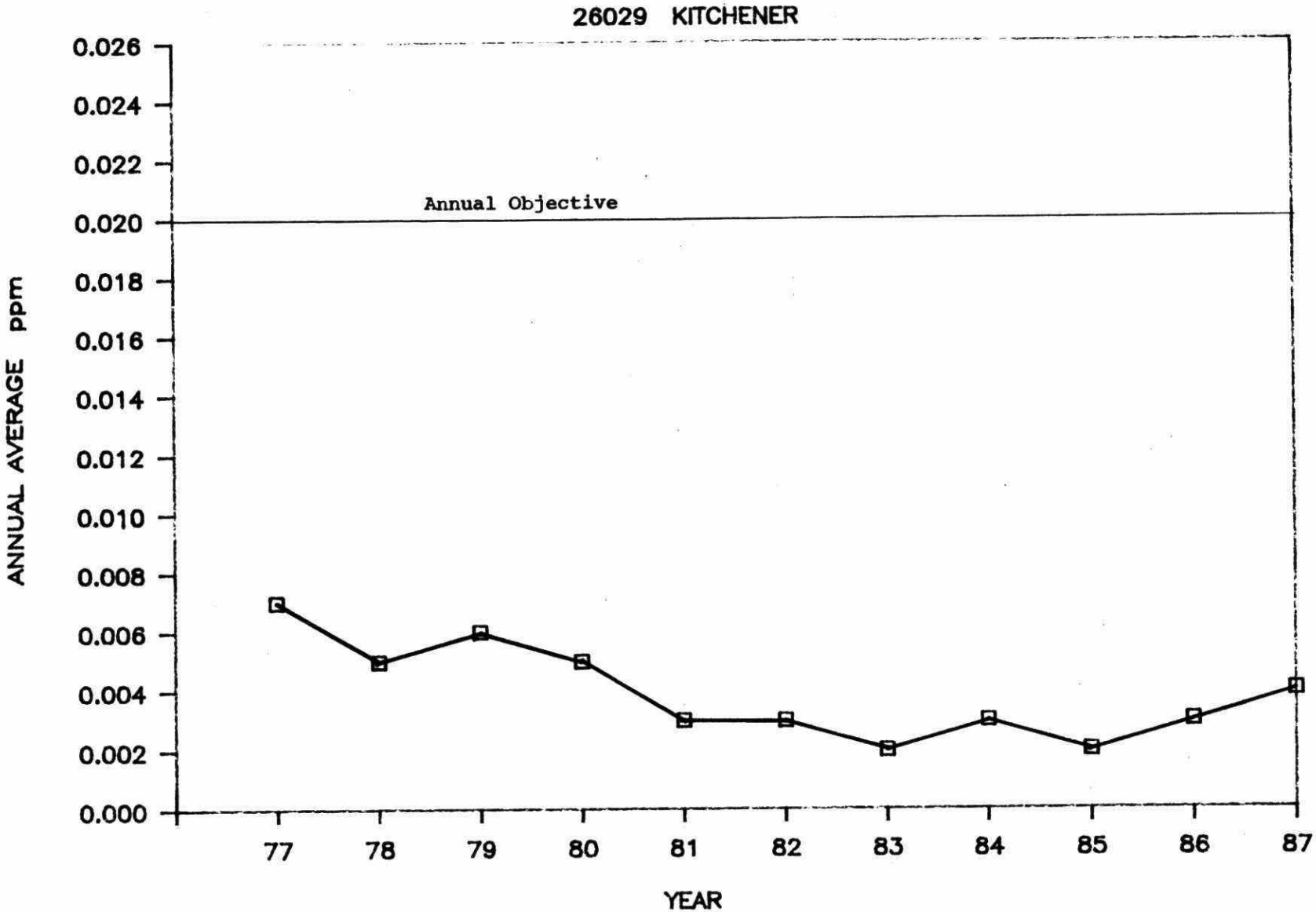


FIGURE 13

CARBON MONOXIDE YEARLY TREND

26029 KITCHENER

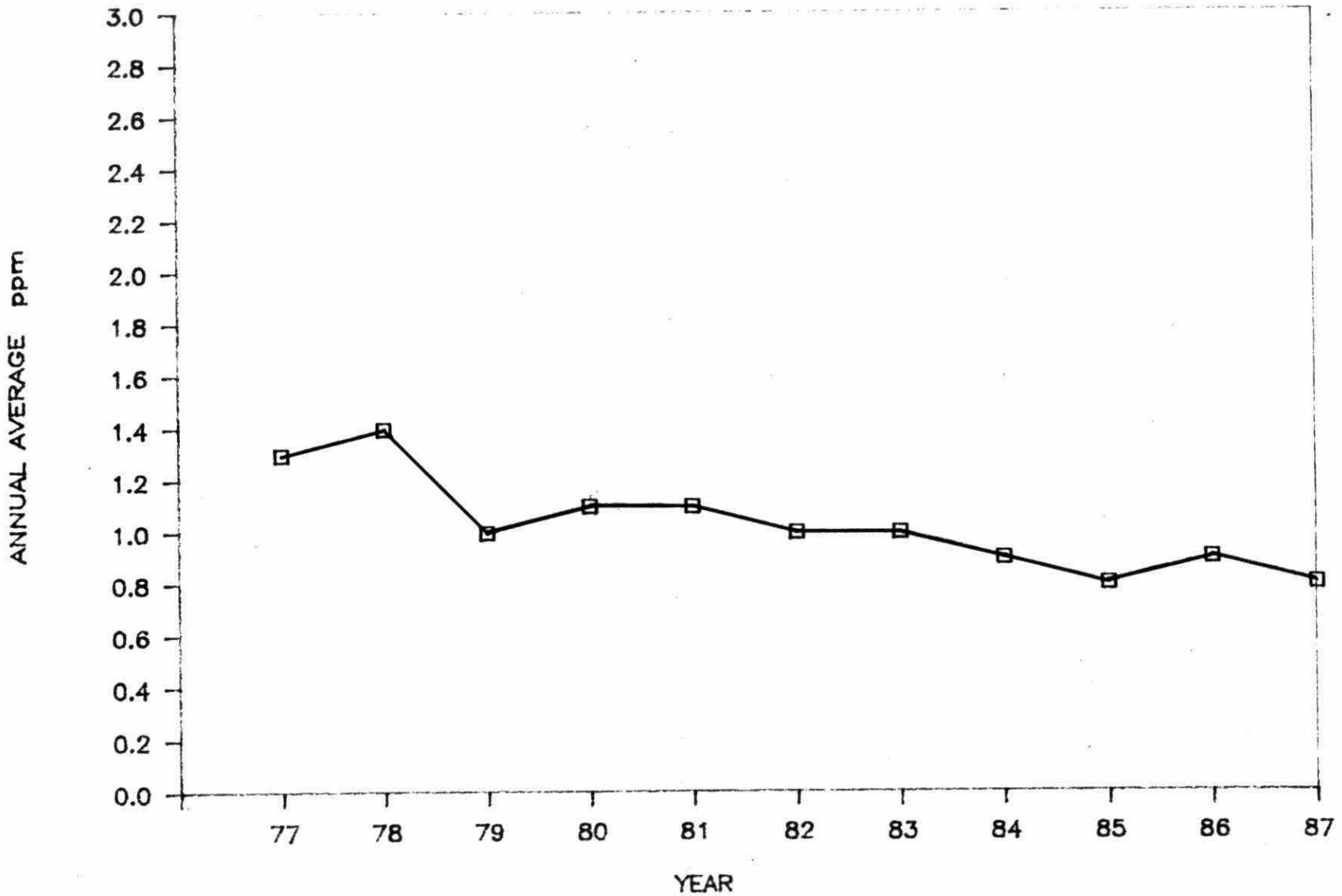


FIGURE 14

NITROGEN DIOXIDE YEARLY TREND

26029 KITCHENER

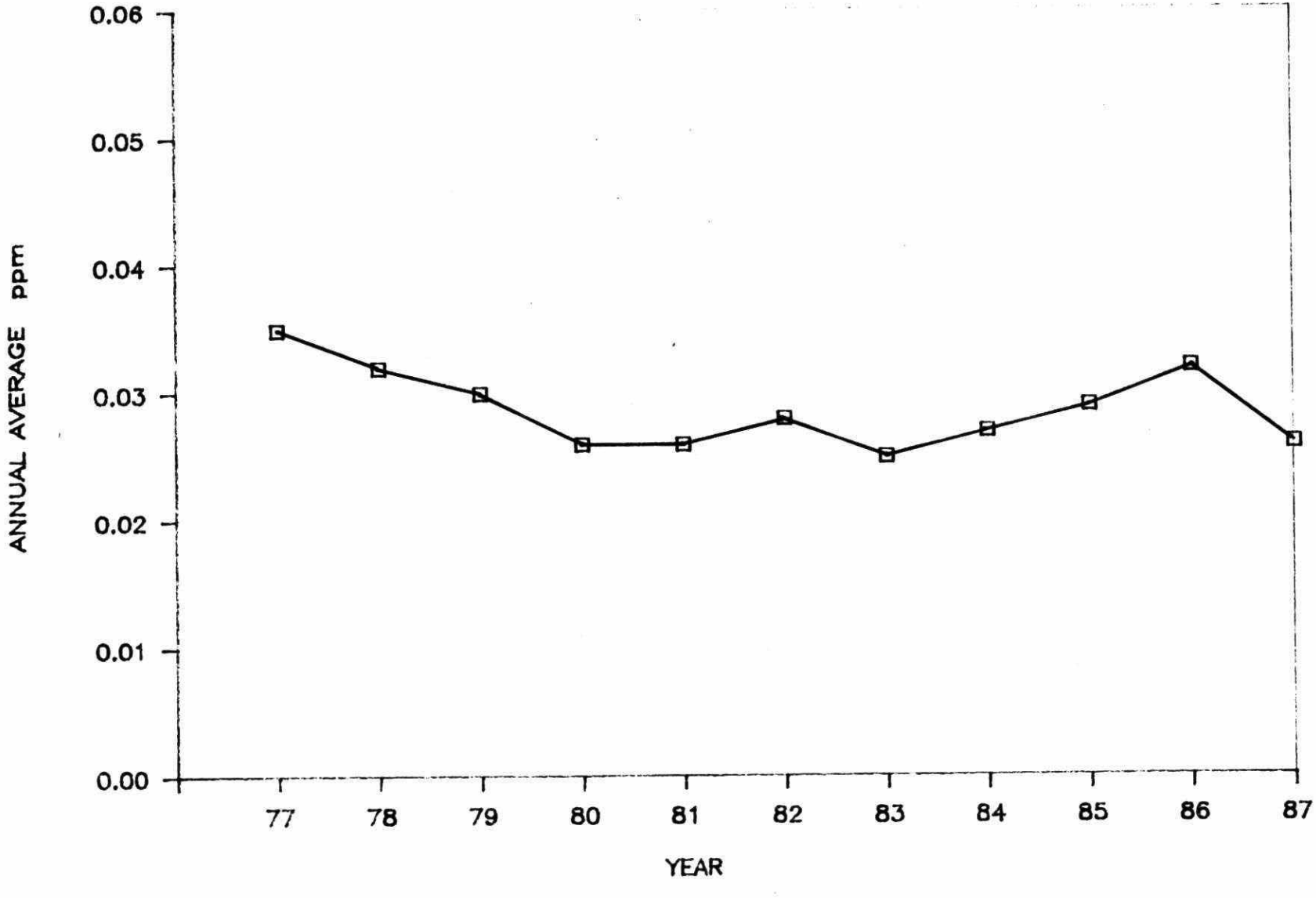
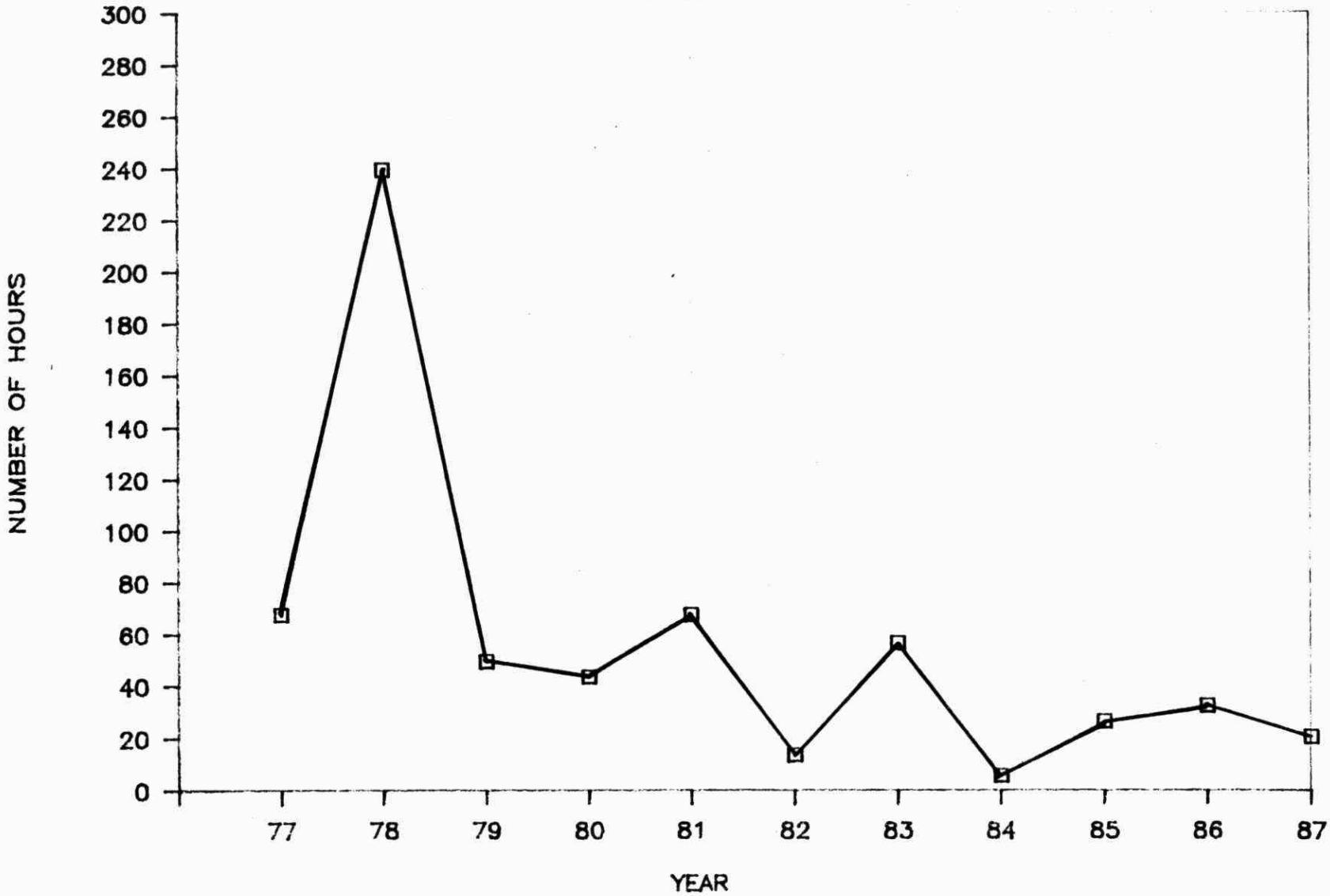


FIGURE 15

OZONE EXCEEDENCE TREND – KITCHENER



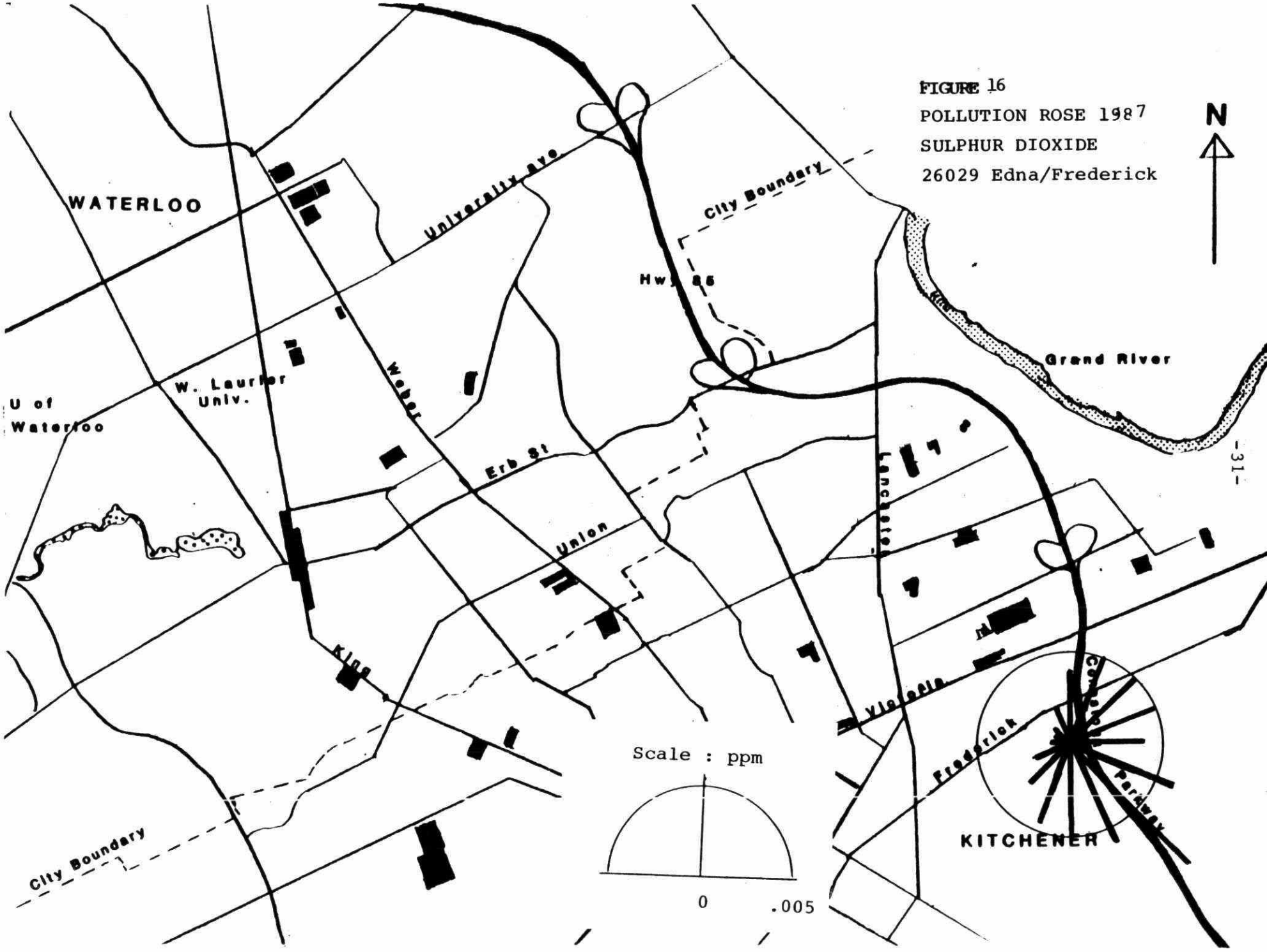


FIGURE 16
POLLUTION ROSE 1987
SULPHUR DIOXIDE
26029 Edna/Frederick

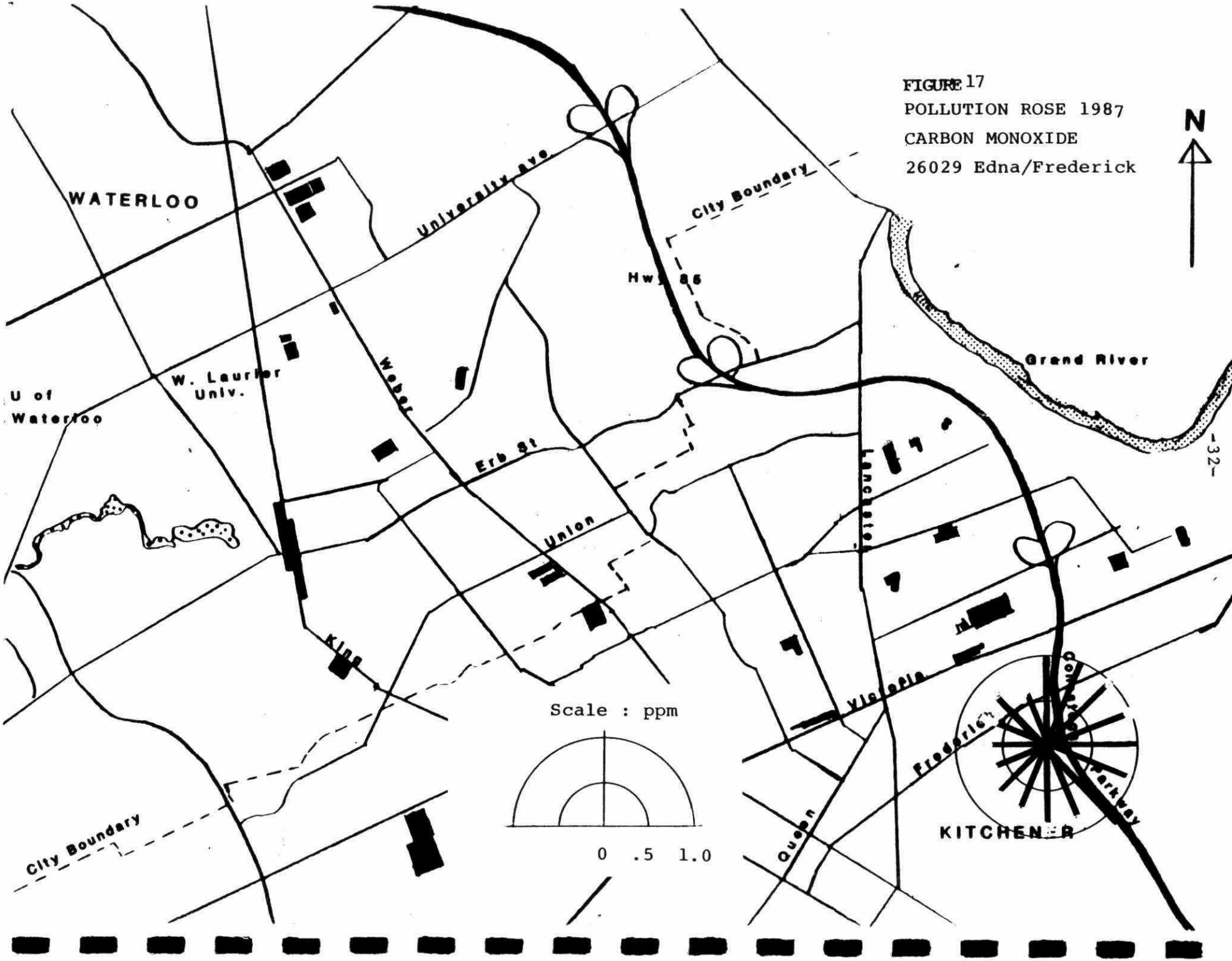


FIGURE 17
POLLUTION ROSE 1987
CARBON MONOXIDE
26029 Edna/Frederick

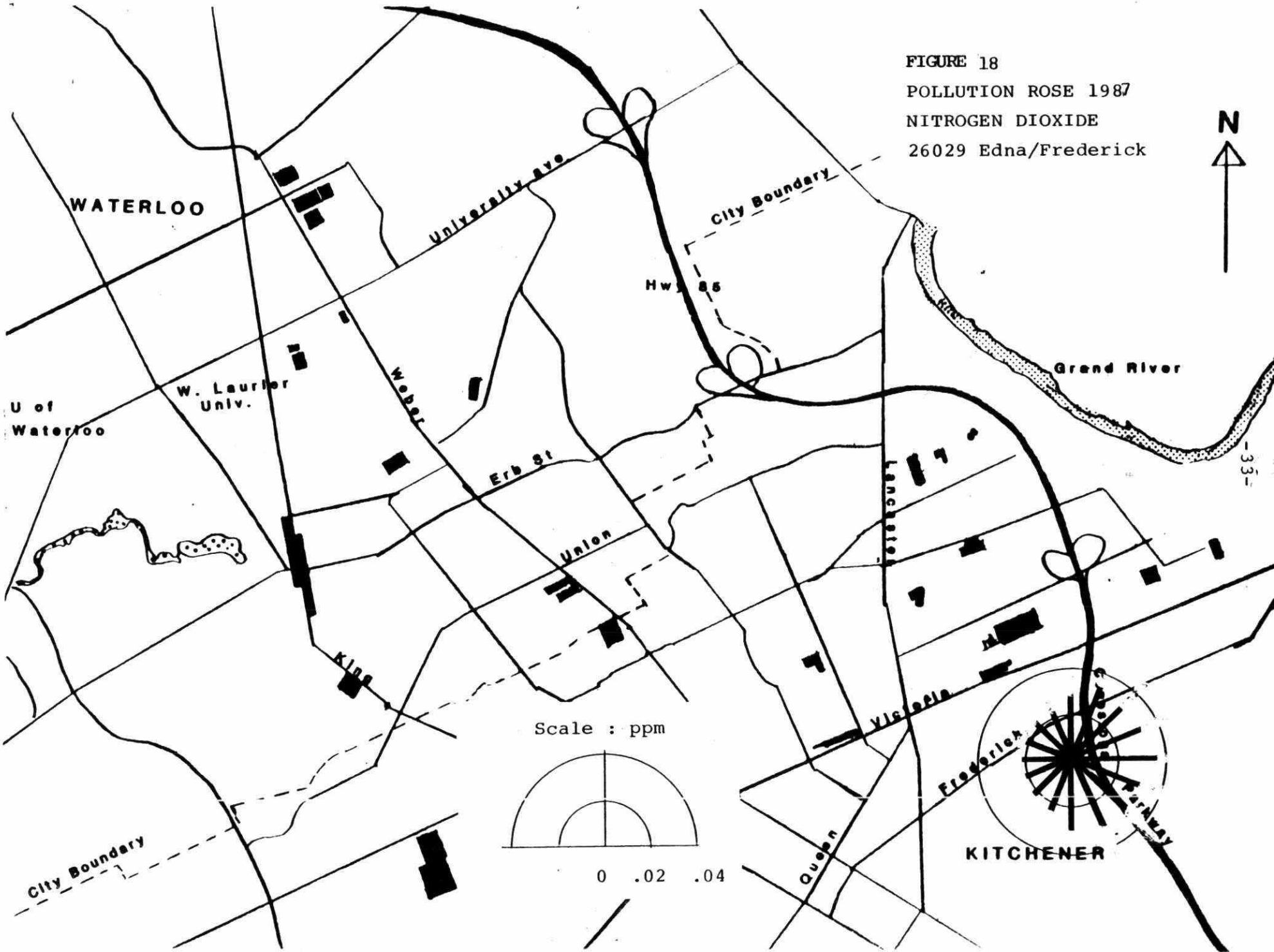


FIGURE 18
POLLUTION ROSE 1987
NITROGEN DIOXIDE
26029 Edna/Frederick

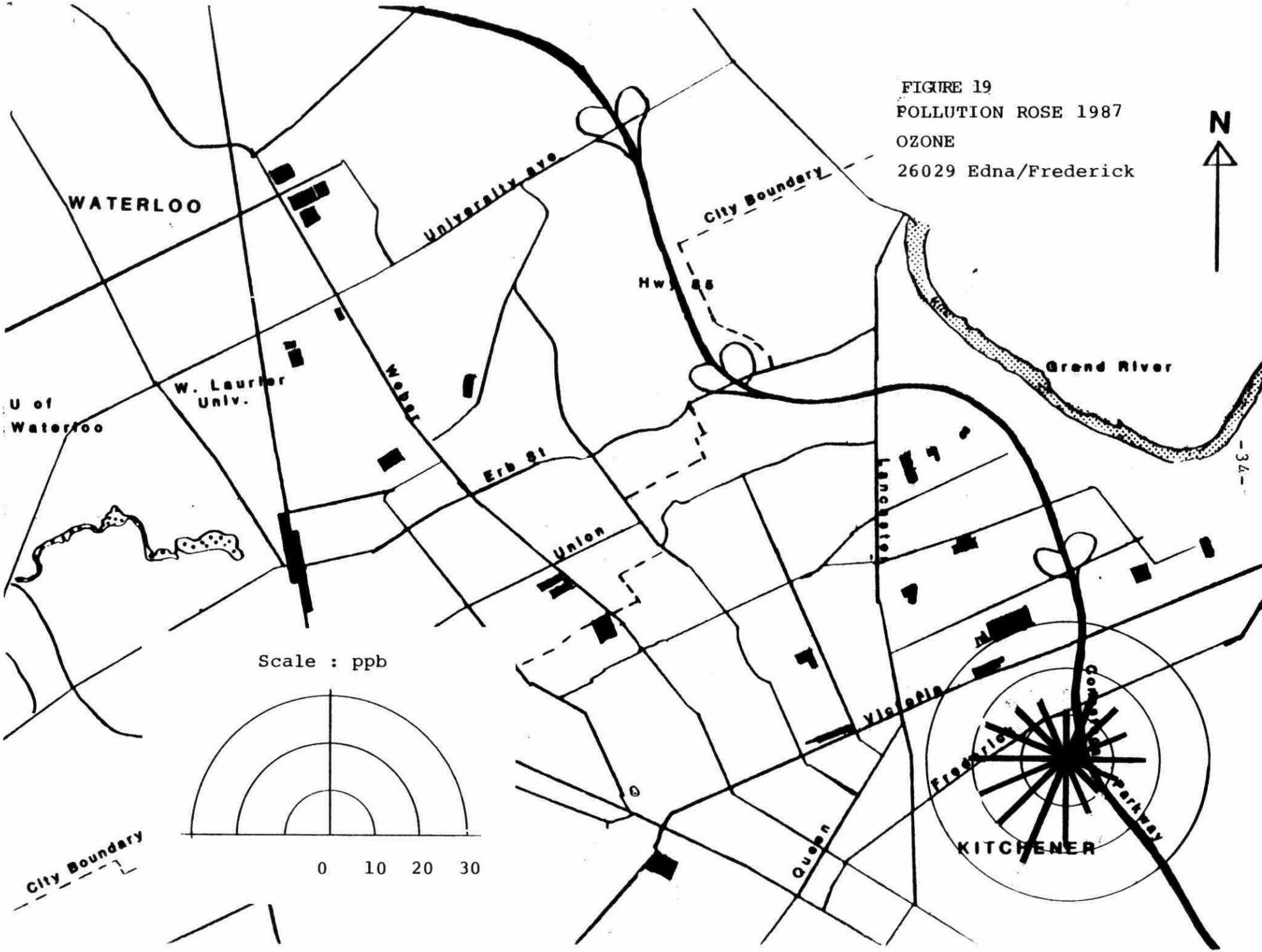


FIGURE 19
POLLUTION ROSE 1987
OZONE
26029 Edna/Frederick

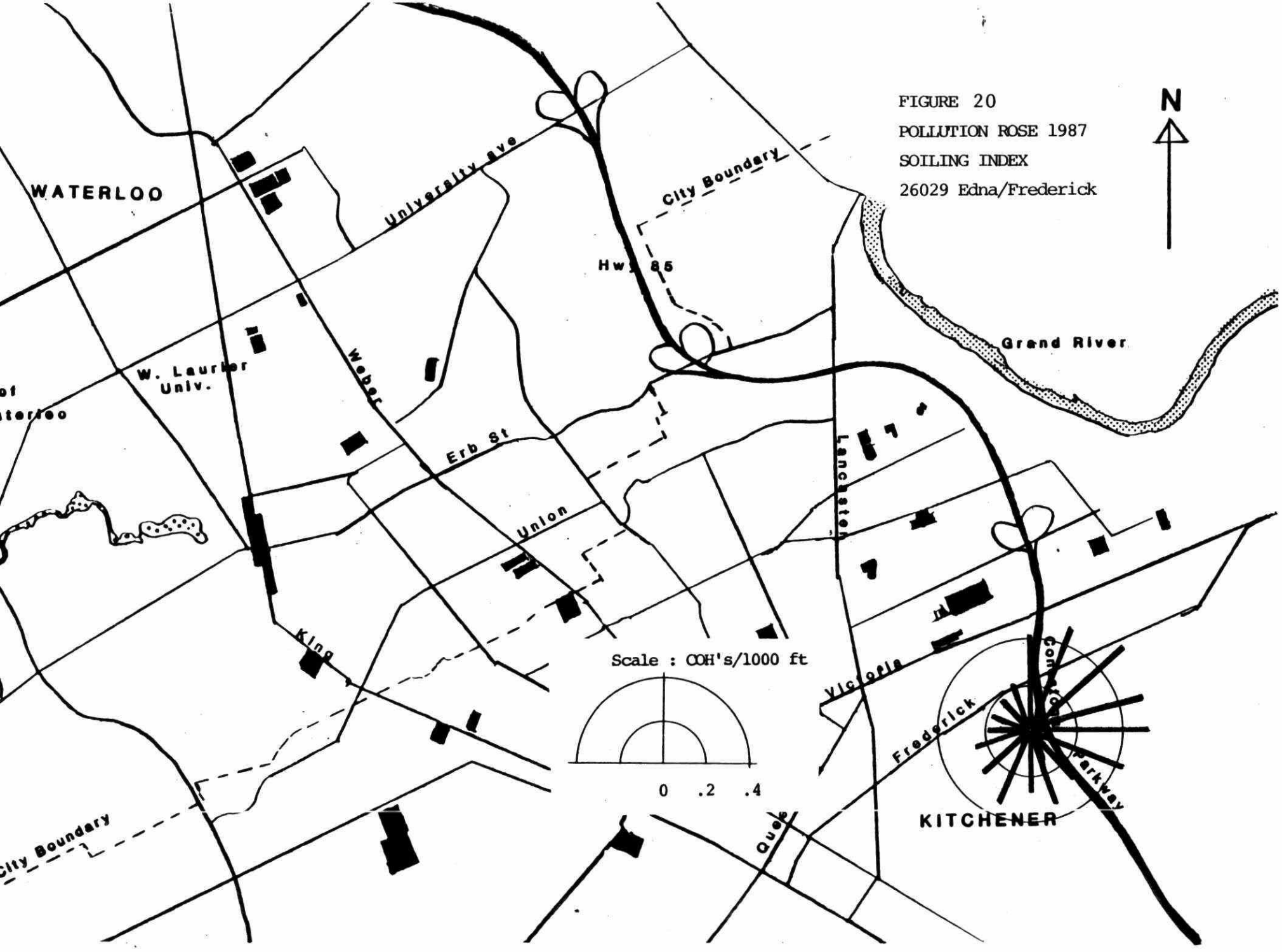
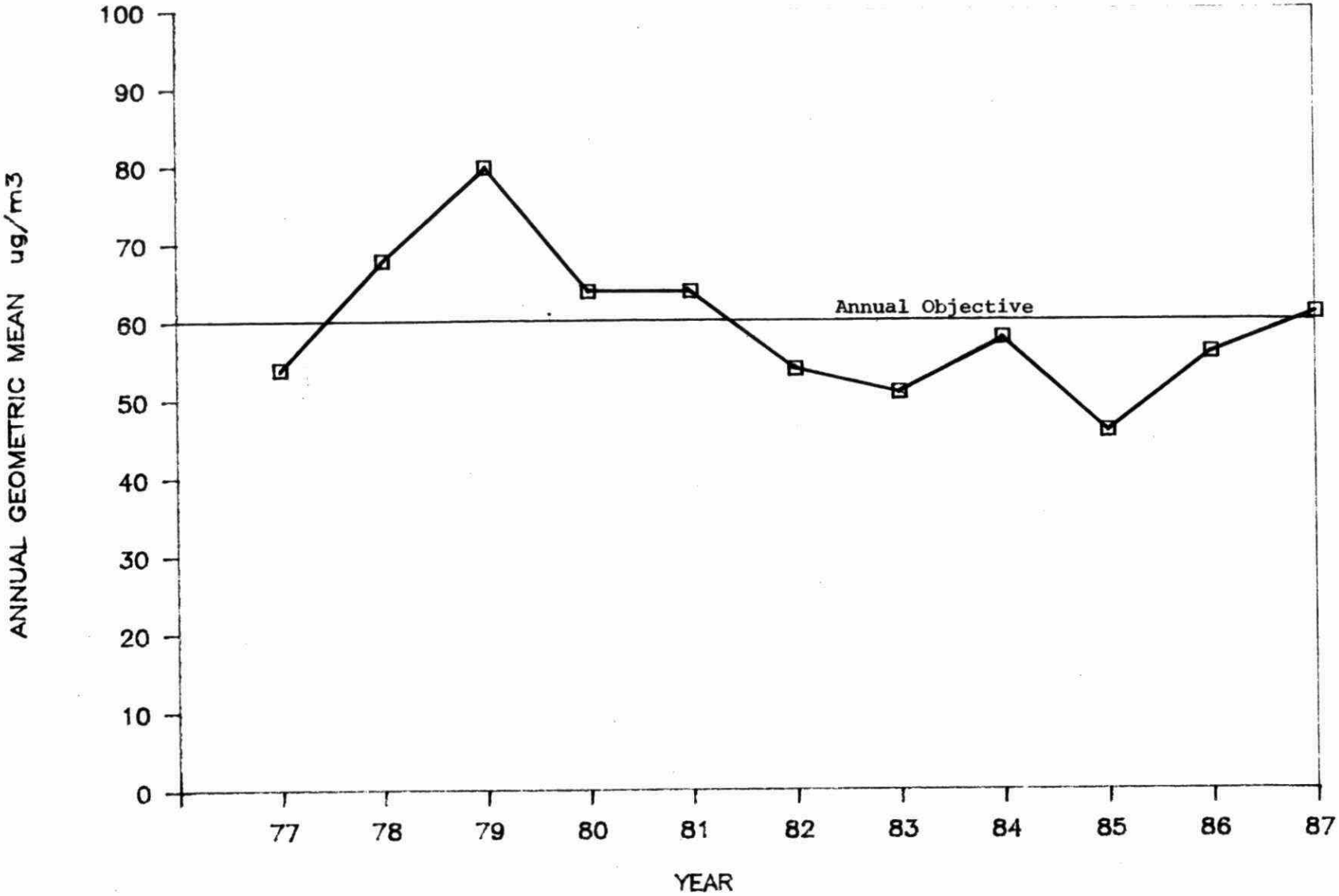


FIGURE 20
POLLUTION ROSE 1987
SOILING INDEX
26029 Edna/Frederick
N
WATERLOO
University ave
City Boundary
Hwy 85
Grand River
W. Laurier Univ.
Weber
Erb St
Union
Lancaster
King
Victoria
Frederick
Conestoga
Parkway
KITCHENER
Queen
City Boundary
Scale : COH's/1000 ft
0 .2 .4

FIGURE 21

SUSPENDED PARTICULATES YEARLY TREND

26029 KITCHENER



The rose for ozone (Figure 19) peaks under south-southwest winds. When levels were high here they were also high over much of the rest of Southern Ontario. Ozone is a photochemical product of long range transport of precursor pollutants (hydrocarbons and oxides of nitrogen) from the United States. It should be noted that southerly winds do not automatically carry high ozone, even during the summer. Specific meteorological conditions are necessary, namely hot, sunny weather. This explains why the peaks of the pollution roses are not overly prominent for southerly winds, compared to the other directions.

Suspended particulates measured at Edna and Frederick were marginally higher than in 1986 (Figure 21), rising slightly above the yearly objective. There were five samples above the daily objective (Table 5), generally on light east wind days. Traffic from the Conestoga Parkway caused the readings. Further, as discussed in the Guelph section, annual trends between Kitchener and Guelph are identical, reflecting mesoscale phenomena, i.e., variations in long range emissions entering the area. The higher levels in Kitchener as compared to Guelph are attributed to the Kitchener station's proximity to the adjacent Conestoga Parkway. Efforts are being made in 1988 to move the main Kitchener station away from the Parkway, in order to be more representative of the City.

From May to October, an intensive sampling survey for suspended particulates was conducted near Hogg Fuel and Supply - a cement manufacturer. For many years this plant had been monitored with a dustfall jar, but data was inconclusive due to a poor monitor siting. The suspended particulate data are summarized in Table 5. Two stations were located close to, but on either side of the plant and both showed mostly acceptable concentrations below objectives. There were two exceedences of the daily objective at the Lancaster Street station. However, both

readings were related to traffic emissions from Lancaster, rather than from the cement plant. The survey found that emissions from the plant were well under control.

Puslinch Township

Complaints of dust fallout from Capital Paving Limited, a quarry operation, prompted a survey with dustfall jars. Station 28030 was located at the entrance to the plant and 28031 was a control location further away (Figure 22).

The samplers were started in July and 28030 recorded an exceedence of the monthly objective in its first sample (Table 6). That was the only exceedence measured to date, including the first few months of 1988. Thus, the quarry appears to be a minor source of dust but monitoring will continue until at least the end of 1988 in order to further confirm that this quarry is not a problem.

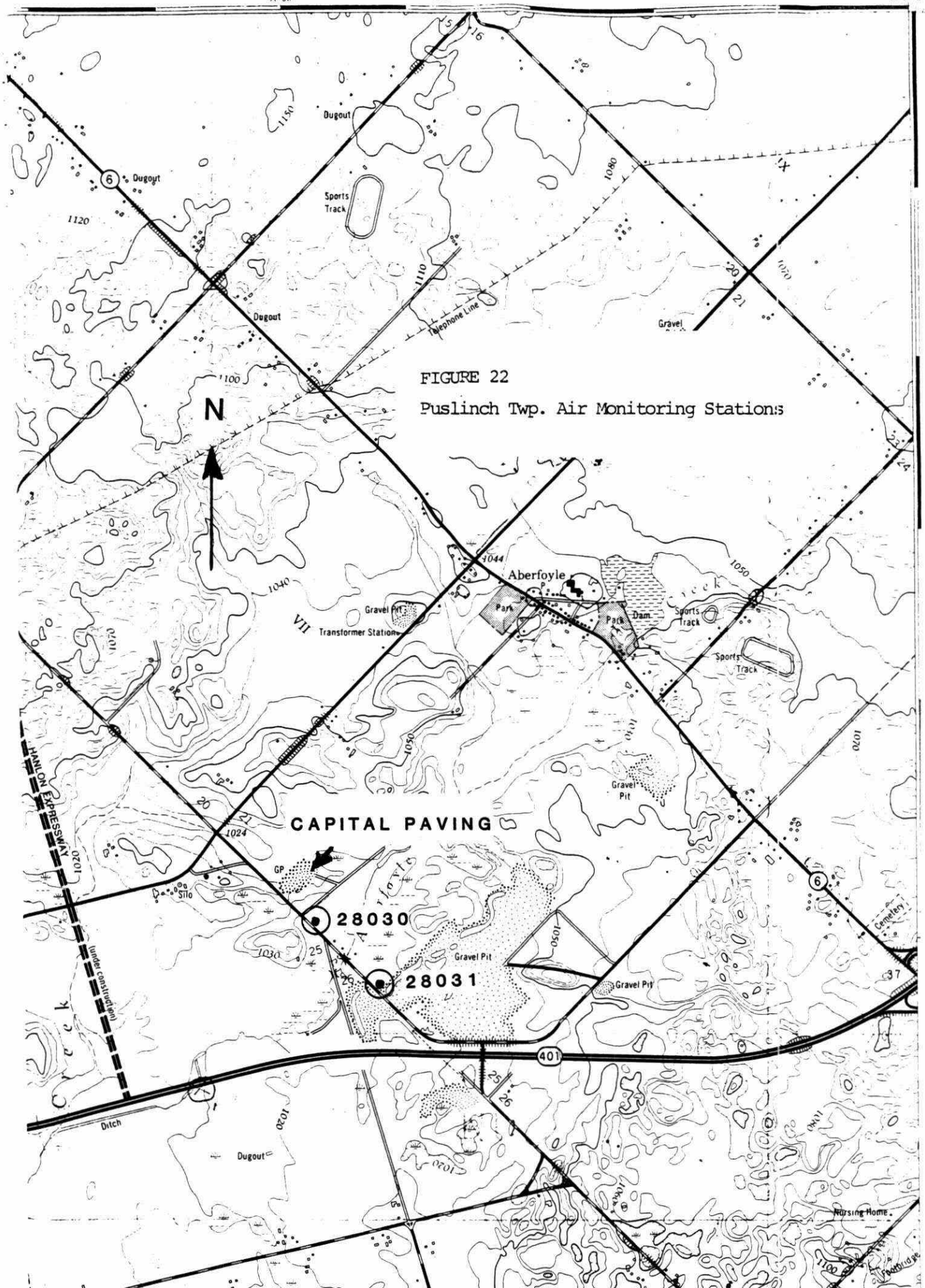


FIGURE 22

Puslinch Twp. Air Monitoring Stations

TABLE 6

SUMMARY STATISTICS - PUSLINCH

PARTICULATES NEAR CAPITAL PAVING LTD.

JULY - DECEMBER 1987

DUSTFALL - grams/square metre/30 days

ONT.OBJECTIVES : 7.0(1 MONTH)
4.5(ANNUAL AVERAGE)

STATION	ANNUAL AVERAGE 1987	1987 MAXIMUM 1 MONTH	NO.MONTHS OVER OBJECTIVE 1987
28030 - CAPITAL PAVING	4.8	9.2	1
28031 - CONCESSION 7	4.5	5.6	0

DISCUSSION

This report has summarized the results of routine air monitoring in the Waterloo and Wellington areas. Where local industrial air pollution problems have been identified, the sources involved have already begun or completed abatement programs to reduce their emissions. Other sources monitored showed minor effects on air quality but will continue to be monitored in some cases.

General air quality as characterized by stations in downtown Guelph and Kitchener was very good.

In 1988, a new air quality data telemetry system was installed and is operational throughout the Province. This new system permits all of the Ministry's stations with continuous analyzers to send data directly to a central computer facility in Toronto allowing for data availability on a real-time basis. In the past, none of the stations in the Waterloo and Wellington areas were telemetered. In Guelph and Kitchener both stations with continuous analyzers required manual reading of strip charts which caused delays of several months in the availability of data. The new telemetry system allows for immediate access to the data in Hamilton and in Toronto and also allows for remote control and maintenance of the instruments. Meteorological instruments will be installed, likely near Kitchener, providing wind and temperature data continuously for the area and a new station was installed in downtown Waterloo in 1988. All of this will result in a more efficient monitoring program.

The main purpose of the new telemetry system was to facilitate a new expanded Air Quality Index (AQI). The new AQI is a function of six different pollutants, which form up to 8 separate subindices. Hourly concentrations of sulphur dioxide, soiling index, carbon monoxide, nitrogen dioxide,

total reduced sulphur and ozone will all be individually converted to the old scale of index numbers with the same advisory or alert levels as the old API, ie., 32, 50, 75 and 100. Not all stations will measure all of the parameters, but the highest hourly sub-index and the pollutant causing it will be reported several times daily to the public. In the Waterloo and Wellington area, the new AQI will be reported for the existing Guelph station, the Kitchener station (to be relocated) and the new station in downtown Waterloo. The new system has the potential to add more communities in the future. The intent of the new index is to better inform the people of Ontario of air quality in their local area.